

JTC DATA REPORT 87-164
ADDENDUM

Follow-up Investigation of
PCB Identifications

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BACKGROUND

After submission of JTC's Data Report 87-164 to Dr. Robert Powell of ENVIRON, questions arose regarding the PCB identifications. It was learned that a sample which JTC analyzed and identified as Arochlor 1242 in samples received January 2, 1987, was resampled in the current sample set and identified as Arochlor 1248 in this data report. In addition, the current samples were split with another lab and they identified Arochlor 1242 as the PCB species present. This information prompted a review of the raw data associated with the samples, as well as further investigation, to attempt to resolve the discrepancy.

ANALYTICAL INVESTIGATIONS

The first phase of the investigation was to reexamine the sample chromatograms relative to standards for Arochlor 1242 and 1248. Table I presents the results of this visual comparison. The actual chromatogram comparisons are presented in Appendix A.

From this initial step, the samples were requantitated based on a calibration curve for Arochlor 1242. Table II presents these results, as well as a comparison of the values when quantitated as 1248. As can be noted, the reported quantities differ only slightly.

In looking at the chromatograms for the standards of 1242 and 1248 presented in Appendix A, one can see that there are only minor differences between the two patterns. It is unusual to see samples which contain characteristics of both these arochlors, as the samples in this case have. A theory was proposed that the samples contained a mixture of the two arochlors.

In order to test the theory, a standard was prepared with a 1:1 mixture of Arochlor 1242 and 1248. This mixed standard was compared to one of the samples. Table III presents the results

of a comparison of peak height ratios of the sample compared to each single arochlor and the mixed standard. As can be seen, the ratios observed in the sample compare most closely with the mixed standard.

In addition to the steps already discussed, one of the samples was chosen for a confirmation run using the GC-Mass Spectrometer. The chromatograms are presented in Appendix B. The unique characteristics of Arochlor 1242 are outlined on the chromatograms in red, and 1248 characteristics in blue. Thus again, in looking at the sample, it appears to have characteristics of both Arochlors.

Further steps were taken to trace the extent of this problem. In addition to examining the current samples more closely, the sample from a previous sampling episode (Hexcel I, JTC ID: 87-0806), reported in JTC Data Report 87-044, which was resampled this time, was also reexamined. Appendix C contains both the GC and the GC-Mass Spec chromatograms obtained from reanalysis. This sample was originally reported as Arochlor 1242. The mass spec chromatogram only shows characteristics of Arochlor 1242. The GC printout comparisons, however, show the mixture of characteristics.

CONCLUSION

From this preliminary investigation, it appears that the samples represent a mixture of Arochlor 1242 and 1248. The evidence presented strongly suggests this possibility. The theory is also supported by the fact that different laboratories have reported samples as Arochlor 1242 and Arochlor 1248 at different times during the work at this site.

Although the mixture theory is certainly strong, other possibilities such as the weathering of the Arochlor might account for the patterns seen. Routine laboratory procedures unfortunately are inadequate for distinguishing the exact cause.

TABLE I
Specific Arochlor

Client I.D. #	JTC I.D. #	<u>Characteristics*</u>	
		<u>1242</u>	<u>1248</u>
MH01-FP02	87-0358	Yes	Yes
CB08-FP01	87-0359	Yes	Yes
BD01-FP01	87-0360	Yes	Yes
BR02-Oil 1	87-0361	Yes	Yes
BR03-Oil 1	87-0362	Yes**	Yes
BR04-Oil 1	87-0363	Yes	Yes**
MH08-SS01	87-0364	Yes	Yes**
MH03-SS01	87-0365	Yes	Yes
MH04-SS01	87-0366	Yes	Yes
BR01-Oil 1	87-0367	Yes	Yes
BR05-Oil 1	87-0368	Yes**	Yes

* Specific characteristics of individual arochlor not found in the other arochlor:

1242: single large peak at front-end and small peak next to 1st double peak grouping.

1248: Four peaks at end.

** Characteristics present but, less distinct.

TABLE II

PCB Concentration Based on
Two Different Aroclors

<u>Client I.D. #</u>	<u>JTC I.D. #</u>	<u>Concentration (ug/g)</u>		<u>Relative % Difference</u>
		<u>as 1242</u>	<u>as 1248</u>	
MH01-FP02	87-0358	1090	936	15
CB08-FP01	87-0359	566	498	13
BD01-FP01	87-0360	9290	8630	7
BR02-Oil 1	87-0361	1410	1250	12
BR03-Oil 1	87-0362	1310	1280	2
BR04-Oil 1	87-0363	4*	2*	--
MH08-SS01	87-0364	11.5	10.0	14
MH03-SS01	87-0365	191	151	23
MH04-SS01	87-0366	300	237	24
BR01-Oil 1	87-0367	5800	5500	5
BR05-Oil 1	87-0368	3460	4060	16

* Below Detection Limit

886110005

TABLE III

Peak Ratio Comparisons

Arochlor 1242	Sample 87-0360	Mixed Standard 1242 1248	Arochlor 1248
.6458353	.4468299	.672896	.6728922
.3022741	.7272168	.7206981	1.200113
.3213719	.5308536	.6003201	.9900627
.3367686	.6156279	.724952	1.165481
.592827	1.023931	1.520311	2.53065
.2777737	.7702024	.7375508	1.492632
	4.220413E-02	.1651793	.1455719
	.2555796	.2548369	.6203308
	.2657365	.2084827	.6408374
	1.695564E-02	2.610748E-02	5.396681E-02
	.1292957	.1546282	.3738958
	.2065151		
	.0259139		
	.1654347		